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IMMEDIATE WATER POLLUTION CONTROL NEEDS. CENTRAL WESTERN SHORE OF CHESAPEAKE BAY AREA (MAGOTHY, SEVERN, SOUTH, AND WEST RIVER DRAINAGE AREAS)

Federal Water Pollution Control Administration
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IMMEDIATE WATER POLLUTION CONTROL NEEDS

CENTRAL WESTERN SHORE OF CHESAPEAKE BAY AREA

(Magothy, Severn, South, and West River Drainage Areas)

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I. INTRODUCTION

A. Purpose and Scope

The purpose of this report is to direct attention to existing and potential water pollution problems in the Annapolis Metropolitan Area. Recommendations are based on evaluations, by personnel of the Chesapeake Bay-Susquehanna River Basins Project, of water quality data assembled from studies conducted by Federal, State, and local agencies

Insofar as applicable, priorities for actions to achieve immediate pollution control needs are presented with the specific objectives to:

1. Identify present and potential water quality problems in the Area.
2. Recommend actions required to alleviate the problem.
3. Suggest institutional arrangements required to have recommended actions carried out
4. Estimate cost of the actions.

This report is intended to summarize immediate pollution control problems and needs and to provide a framework for the more detailed studies needed in a comprehensive program of water quality control

B. Authority

The basis for action can be found in the Federal Water Pollution Control Act as amended (33 U.S.C. 466 et seq), with special emphasis upon provisions regarding Comprehensive Programs for Water Pollution Control, Grants for Water Pollution Control Programs, Grants for Construction, and Enforcement Measures Against Pollution of Interstate or Navigable Waters.

C. Acknowledgments

The assistance and cooperation of the following Government agencies enabled the Chesapeake Bay-Susquehanna River Basins Project to assemble and evaluate water quality data in the Area in what would otherwise have taken a much longer period.

Maryland Department of Water Resources

Maryland Department of Health

Anne Arundel County Department of Health

Anne Arundel County Department of Public Works

Annapolis City Department of Public Works

II. SUMMARY

The water quality control needs of the Area are summarized in the following tabulations. Table I shows the need for and cost of major water pollution control facilities which are required for immediate improvement of water quality in the Area. Table II gives the list of institutional activities and studies which will be necessary to further evaluate and meet the pollution control needs within the Basin.

TABLE I

CONSTRUCTION NEEDS

Location	Responsibility	Need	Cost
Metropolitan Areas of Anne Arundel County	Anne Arundel County	Provision of public sewerage facilities, including centralized secondary treatment	$29,654,000
U. S. Naval Academy	U. S. Department of Defense	Upgrade present sewage treatment plant from primary to secondary	$250,000
Annapolis City	Annapolis City	Upgrade present sewage treatment plant from primary to secondary	$1,500,000
U. S. Naval Academy	U. S. Department of Defense	Either provide adequate treatment for or arrange to discharge laundry waste to Annapolis sewage system*	$50,000
Thomas Point Shoals Light Station	U. S. Coast Guard	Provide adequate disinfection of all waste	$200

* This problem also may be eliminated if present plans to relocate the laundry are carried out.

TABLE II

PLANNING AND STUDY NEEDS

Location	Primary Responsibility	Need
Basinwide	Maryland Department of Water Resources, Maryland Department of Health	Maintain an up-to-date inventory of waste discharges.
Estuarine Waters	FWPCA, Anne Arundel County Department of Health, Maryland Department of Health	Determine the relative importance of recreational boat pollution in the area and modify the present laws and regulations to conform with such findings.
Annapolis	Annapolis City	Determine and eliminate the cause of poor water quality within the sewered areas of the city.
Basinwide	Maryland Department of Water Resources, Maryland Department of Health, FWPCA	Set guidelines for the degree of treatment to be required for waste discharges into the Chesapeake Bay. Such guidelines should consider requirement for removal of nutrients, BOD, and bacteria

III. BASIN DESCRIPTION

The Area covered in this report is located just south of the Baltimore Metropolitan Area (Figure 1). It extends through Anne Arundel County along the western shore of the Chesapeake Bay into Calvert County. It is bordered on the west and south by the Patuxent River Basin. Long and narrow, particularly toward the south, it includes an area of 270 square miles of land and over 190 miles of waterfront.

The land surface throughout the Area is gently rolling, dropping progressively from a high area in the west to the shoreline. The Area is drained by hundreds of small creeks and streams that flow into the estuaries and the Bay. The temperate climate, extensive water frontage, good transportation, and ready access to the Baltimore and Washington Metropolitan Areas make the Area well suitable for residential and industrial growth.

Probably the most important single resource of the Area is the extensive waterfront available for recreation and commercial fish and shellfish activities.

The Area, which for many years was essentially an agricultural area, has rapidly become more urbanized. There has been a steady growth of light industry and a rapid growth of population, especially in the northern portion. This rapid population growth is attributable in part to an in-migration of people who are working in the Baltimore and Washington Areas

and making their residence in the Annapolis Area, and to the growth of light industrial and research and development firms in the northern portion of the Basin.

Present trends indicate that population of the Basin (90,000) will probably double within the next ten to 15 years.

This rapid increase in population will tax what is probably the Area's most important resource--good water quality along its extensive shoreline.

IV. EXISTING WATER QUALITY

A summary of results of a survey of water quality made by the Chesapeake Field Station* in the spring of 1967 indicates that there are many areas in the Basin which do not presently meet the bacteriological water quality standards which have recently been adopted by the State of Maryland.**

With the expected population growth, the Area's water quality will worsen unless extensive water pollution control measures are taken.

The problem is primarily one of bacteriological quality which is being degraded by defective septic systems in the high-density population areas.

Nutrient concentrations are not excessively high when compared to the water of the Baltimore and Washington Areas, although they are higher than the Bay proper. Whether the major source of the nutrients is land run-off or domestic wastes has not been determined.

The effects of the massive recreation boating of the Area on water quality is also as yet unclear.

Studies of the sources and effects of nutrients and of the relative importance of boat pollution are presently being carried out by staff of the Chesapeake Field Station.

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* Open Files Report - Chesapeake Field Station.

** Water Resources Regulation 4.8 - General Water Quality Criteria and Specific Water Quality Standards for all Maryland Waters, Maryland Department of Water Resources, Annapolis, Maryland, May 22, 1967.

V. RECENT PROGRESS IN POLLUTION CONTROL

Comprehensive plans for sewerage systems for the entire Anne Arundel County Area have been prepared. Progress in the implementation of the plan has been hindered by difficulties in locating sewage treatment plant sites.

This difficulty occurs because almost the entire shoreline of the County is devoted to residential and recreational use, and there is popular opposition to the use of such land for a sewage treatment plant. Past experience of the public has shown that plants are frequently undesirable because of odors and their general appearance. There is also a popular belief that regardless of the type or degree of treatment of the plant, its effluent would degrade the waters of the Chesapeake Bay--their most valued resource.

In the interim, sewerage systems, including temporary package sewage treatment plants which discharge into the tributaries, are being installed throughout the Area. These plants are effective in preventing water quality degradation in the limited area they serve.

Continuing public education and shoreline survey work by the Anne Arundel and Calvert County Departments of Health have obviously helped to prevent the septic tank situation from becoming completely intolerable.

In 1966 the Maryland General Assembly amended the Annotated Code of the State of Maryland relating to water supply and

sewage. According to the amendment, the Counties are required to develop County plans to provide adequate water supply systems and sewage systems by 1970 and to include a time schedule with cost figures to implement the program. The State Department of Health was designated the approving agency, with opportunity for review offered to the Maryland Department of Water Resources.

In January 1966, the Governor of Maryland announced that the State of Maryland would comply with the Federal Water Quality Act of 1965. Since that time the State has established and adopted:

1. Water quality standards for interstate waters in Maryland.
2. A plan for the implementation and enforcement of the standards.

The adopted standard and plan have been forwarded to the Department of the Interior for final approval.

VI. IMMEDIATE NEEDS

As stated previously, the prime natural asset of the Annapolis Metropolitan Area is its extensive waterfront. In addition to its value as commercial shell and finfish propagation area, it has enormous and growing recreational and aesthetic value.

Water quality studies have shown the water quality to be generally good, but in some places it is presently below the water quality standards proposed by the State Department of Water Resources for the Area. It is recommended that the following actions be taken to correct these situations and to prevent further deterioration in water quality in the Basin.

A. Public Sewage Facilities

The primary reason for the poor water quality is apparently the result of lack of public sewage facilities. Except for Annapolis City and a few isolated areas in the County, the Area is as yet unsewered, and problems of overflowing and defective septic systems are common.

Provision of public sewerage facilities is the most pressing need in the Area. Master plans to sewer the entire Anne Arundel County Area and provide secondary treatment for all wastes have been prepared. The final cost of these projects is shown in Table I.

B. Treatment Plant Design Guidelines

As previously stated, progress in implementation of the proposed plans to provide sewage facilities has been hindered by the public unwillingness to accept the premise that sewage treatment plants can be designed so that they are aesthetically acceptable and so that they will produce an effluent which will not degrade water quality of the Chesapeake Bay. A public education program may be necessary to overcome the first objection, but the second objection is more serious.

It is not possible at present to definitively state the long-term effect of treated waste discharges on the Bay. Because the Bay is a complex ecosystem, it is virtually impossible to calculate its assimilative capacity in a conventional sense. The long-range ecological effects and many immediate physical effects cannot be stated with certainty. Of primary concern are the following relationships:

1. Biological Oxygen Demand -- Dissolved Oxygen
2. Nutrients -- Algae -- Turbidity -- Dissolved Oxygen
3. Bacterial levels
4. Physical effects on the present salinity structure and circulation.

This lack of knowledge and uncertainty regarding the degree of treatment required for wastes discharging into the Bay has become a cause for public concern. Because of this,

it is recommended that the Maryland Department of Water Resources, Maryland Department of Health, and the Federal Water Pollution Control Administration set guidelines for the degree of treatment to be required for wastes discharged to the Chesapeake Bay. Such treatment requirements should include specifications for BOD, DO, suspended solids, nutrients, and bacteriologic levels. They should also consider requirements for installation of duplicate facilities and other devices to lessen the probability of plant failure.

It must be emphasized that because of the complex nature of the system, the treatment requirements cannot be based on deterministic cause and effect relationships but must be the combined judgment of the scientific, engineering, and political community and must take into account the possible economic and social consequences of degradation of water quality of the Chesapeake Bay.

As an interim step, it is recommended that all plants in the Area immediately provide the equivalent of secondary treatment, and for those waste treatment plants in the design phase, consideration should be given to possible future requirements for a higher degree of treatment and nutrient removal.

C. Water Quality in Severed Areas

A recent Chesapeake Field Station water quality survey in the Annapolis Area has shown that water quality is poor in

some completely sewered areas within the City of Annapolis Whether this is the result of a defective sewer system or the result of urban land run-off is not known and must be determined so that corrective action can be taken.

D. Boat Pollution

The relative importance of recreational boat pollution on water quality is not known. Boat pollution studies are presently being conducted by staffs of the Chesapeake Field Station and the Anne Arundel County Department of Health. When these studies are completed, present laws and regulations concerning sanitary facilities on boats should be modified to conform with their findings.

E. Municipal and Industrial Waste Inventory

A lack of data on existing municipal and industrial waste discharges and their adequacy is prevalent. This can be seen in the municipal and industrial waste inventory given in Table III, compiled from records of State and County Health Departments. The data for population served, average flow, and BOD discharged were, in many cases, not known at the time the report was prepared. Such an inventory is necessary in order to fully evaluate the need for additional facilities.

TABLE III

MUNICIPAL AND INDUSTPIAL WASTE INVENTORY

Facility Served	Location	Population Served	Waste Type	Average Flow mgd	Type Treatment	BOD Discharge lb/day	Remarks
Sandy Point State Park	Chesapeake Bay		Sanitary		Secondary, Chlorination		
Westinghouse Corporation	Chesapeake Bay		Sanitary		Secondary, Lagoons, Chlorination		
Bay Manor Nursing Home	Whitehall Creek		Sanitary		Secondary		
Charter House Motel	Mill Creek		Sanitary				
USNA	Carr Creek		Sanitary	0.40	Primary	600	
USNA	Severn River		Cooling Water	11.6	None	0	
Annapolis City	Severn River	28,100	Sanitary	3.50	Primary, Chlorination	7,000	
USNA	Severn River		Laundry	0.18	None	1,300	
Dreams Landing	Severn River						
Sherwood Forest	Severn River						

TABLE III (Continued)

Facility Served	Location	Population Served	Waste Type	Average Flow mgd	Type Treatment	BOD Discharge lb/day	Remarks
National Plastics Products Company, Inc.	Picture Frame Branch (Severn River)		Cooling Water	0.86	None	0	Sanitary waste discharged to Anne Arundel County, Little Patuxent River Sewage Treatment Plant.
National Industries, Inc.	Picture Frame Branch (Severn River)		Cooling Water		None	0	Sanitary waste discharged to Anne Arundel County, Little Patuxent River Sewage Treatment Plant.
Bay Ridge Beach	Pond (Chesapeake Bay)						
Thomas Point Shoal Light Station	Chesapeake Bay		Sanitary	0.0005	None		
Sylvan Shores	South River		Sanitary		Secondary, Chlorination		
Summer Hill Trailer Park	Broad Creek (South River)		Sanitary				
Crownsville State Hospital	Bacon Ridge Branch	1,525	Sanitary	0.52	Secondary, Chlorination		
Mayo School	Ramsey Lake (South River)						

TABLE III (Continued)

Facility Served	Location	Population Served	Waste Type	Average Flow mgd	Type Treatment	BOD Discharge lb/day	Remarks
Chesapeake Instrument Company	Hopkins Cove (West River)	240	Sanitary	0.006	Secondary, Chlorination		
Stewart's Motel	Bear Creek (Rhode River)		Sanitary	0.01	Secondary, Chlorination		
Woodfield Fish and Oyster Company	Tenthouse Creek (Rhode River)		Wash water, Cooling water	0.06	None		
Pirates Cove	South Creek	60	Sanitary	0.006	Secondary, Chlorination		
Chesapeake Yacht Club	West River	50	Sanitary	0.005	Secondary, Chlorination		
Bay Front, Shopping Center (Beale)	Rockhold Creek		Sanitary	0.010	Secondary, Chlorination		
Randle Cliffs	Chesapeake Bay			0.03			
North Beach Sewage Treatment Plant	Chesapeake Bay	600	Sanitary	0.20	Secondary, Chlorination		
Chesapeake Beach	Chesapeake Bay	400	Sanitary		Secondary, Chlorination	Under construction	
Anne Arundel County		20,000*	Sanitary		Septic Tanks		

* County Health Department estimates 10 to 15 per cent of the systems are failing.

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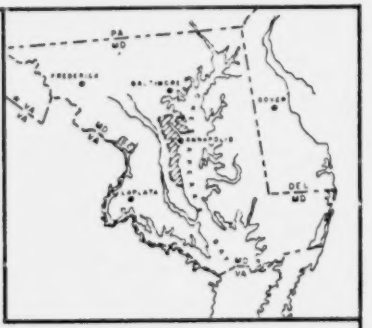
VII. INSTITUTIONAL ARRANGEMENTS

The entire northern area is under political control of Anne Arundel County, except a narrow strip bordering on the Bay south of Herring Bay which is in Calvert County and the area within the Annapolis City limits. Some problems have developed between the City and County regarding the extension of city facilities to serve county residents in close proximity to the City. A political solution to this problem will undoubtedly be found in the near future.

Beyond this, the recent State legislation regarding water and sewage planning, and the Federal and State legislation regarding water quality standards, and the apparent ability of the County to provide needed service, should provide an adequate administrative framework for implementing the proposed immediate needs.

MAJOR WASTE WATER DISCHARGES:

1. SANDY POINT STATE PARK
2. WESTINGHOUSE CORP
3. BAY MANOR NURSING HOME
4. CHARTER HOUSE MOTEL
5. DREAMS LANDING
6. U.S. NAVAL ACADEMY
7. ANNAPOLIS CITY
8. BAY RIDGE BEACH
9. THOMAS POINT SHOAL LIGHT STATION
10. CROWNSVILLE STATE HOSPITAL
11. SUMMER HILL TRAILER PARK
12. SYLVAN SHORES
13. STEWARD'S MOTEL
14. WOODFIELD FISH & OYSTER
15. PIRATES COVE
16. CHESAPEAKE YACHT CLUB
17. CHESAPEAKE INSTRUMENT CORP
18. BAY FRONT SHOPPING CENTER
19. NORTH BEACH
20. CHESAPEAKE BEACH
21. RANDLE CLIFFS



LOCATION MAP

N

SCALE IN MILES

5 0 5 10 15

IMMEDIATE WATER POLLUTION CONTROL NEEDS
CHESAPEAKE BAY DRAINAGE AREA

CENTRAL WESTERN SHORE CHESAPEAKE BAY AREA

U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
MIDDLE ATLANTIC REGION CHARLOTTESVILLE, VA.

FIGURE 1

VIII. BIBLIOGRAPHY

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